

# PATENT SPECIFICATION



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## COMPLETE SPECIFICATION.

### Device for Actuating Electric Switches.

We, MASCHINENFABRIK OERLIKON, a corporation organised under the laws of Switzerland, of Oerlikon, near Zürich, Switzerland, do hereby declare the nature of this invention and in what manner the same is to be performed, to be particularly described and ascertained in and by the following statement:—

This invention relates to a device for actuating electric switches, of the type in which the switch is actuated electrically through a gear train.

Electric switches of the aforesaid type are generally closed by means of an electric motor through transmission members, such as gear drives. If during the course of the switching-on, the current is interrupted in the controlling circuit of the electric drive either owing to the source of current being cut off in consequence of the melting of a fuse or owing to incorrect manipulation of the controlling switch, or for some other reason, the switch returns to its "off" position with insufficient rapidity owing to the torque of the return spring and that of the switch apparatus being insufficient to return the gear drive with sufficient rapidity. This circumstance can lead to dangerous explosions for example in the case of oil switches and particularly oil switches having step resistances, since as a result of the slow opening of the switch in the above circumstances, the arc of interruption remains too long or the step resistances burn through.

According to the present invention there is provided a release device which is controlled by a member mounted on and driven by the shaft carrying the final member of the gear train, and which is adapted to uncouple the switch to be actuated from the driving device as soon as the driving force falls during the switching-on process.

In order more clearly to understand the invention reference is made to the accompanying drawings where Fig. 1 shows diagrammatically, by way of example, one

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embodiment of the invention. In this figure, an electric motor 1 actuates the switch lever 5 and thus the switch 7, through a cam 4 and gear wheels 2, 3. The position illustrated indicates the switch in the "on" position. The closing direction of the driving device is indicated by arrow *a*. A lever 9 is clamped on the shaft 3<sup>a</sup> of the final gear wheel 3 of the driving train in such a manner that the friction produced is sufficient to release a unidirectional coupling 6 through the rod 12 and lever 13, as soon as the shaft 3<sup>a</sup> is moved counter to the direction of the arrow *a*, i.e. in the "off" direction. The lever 9 moves at the commencement of the "on" movement until it encounters a stop 10, adapted to prevent the further movement of the lever 9 until the completion of the switching-on. If the actuating current of the driving motor 1 should, during the course of the switching-on, fail at any particular point, then the shaft 3<sup>a</sup> is pulled in the opposite direction to that of the arrow *a*, i.e. in the "off" direction, by means of the return spring 8. During this movement, the lever 9 is rotated against the stop 11 and the unidirectional coupling is actuated through the rod 12 and lever 13. The switch is instantaneously cut-out independently of the return movement of the driving train.

The lever 9 may, instead of acting mechanically upon the unidirectional coupling 6, close the circuit of the release magnet 14 of the switch 7 by means of a contact device similar to the release relay 15 shown in Fig. 1, the release circuit being preferably fed by a source of current independent of the motor circuit.

Instead of being actuated by friction, the lever 9 may also be mounted loosely upon the shaft 3<sup>a</sup> and be driven by any known unidirectional driving device actuated by said shaft.

Fig. 2 shows by way of example a unidirectional device consisting of a ratchet

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wheel and pawl. The ratchet wheel 16 is fixed on the switch shaft 3<sup>a</sup>. The lever 9 with its pawl 17, engaging the ratchet wheel, effects the release of the switch when the switch shaft rotates counter to the "on" direction a.

Fig. 3 illustrates a unidirectional device with a ball stop, suitable for the same purpose. The hollow cylinder 18 is fixed on the switch shaft 3<sup>a</sup>. The lever 9 has an arm with a tapering face, on which rests a ball 19. On rotation of the shaft 3<sup>a</sup> in the "off" direction, the ball wedges between the tapered face and the hollow cylinder 18, thereby effecting the release of the switch.

Having now particularly described and ascertained the nature of our said invention and in what manner the same is to be performed, we declare that what we claim is:—

1. In a device for actuating electrical switches, of the type in which the switch is actuated electrically through a gear train, a release device controlled by a member mounted on and driven by the shaft carrying the final member of the gear train, said release device being adapted to uncouple the switch to be controlled from its driving device as soon as the driving force fails during the course of switching-on.

2. Device as set forth in Claim 1, in which the uncoupling of the switch from its

driving device is effected by a member frictionally driven by the shaft carrying the final member of the gear train.

3. Device as set forth in Claim 1, in which the uncoupling of the switch from its driving device is effected by a member driven from the shaft carrying the final member of the gear train, through ratchet and pawl mechanism.

4. Device as set forth in Claim 1, in which the uncoupling of the switch from its driving device is effected by a member driven from the shaft carrying the final member of the gear train, through a ball locking device.

5. Device as set forth in Claim 1, in which the uncoupling of the switch from its driving device is effected by an electric contact device actuated from the shaft carrying the final member of the gear train, through a release circuit of the switch.

6. The devices for actuating electric switches, substantially as described with reference to the accompanying drawings.

Dated this 2nd day of June, 1927.

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Agent for the Applicants.

*[This Drawing is a reproduction of the Original on a reduced scale.]*

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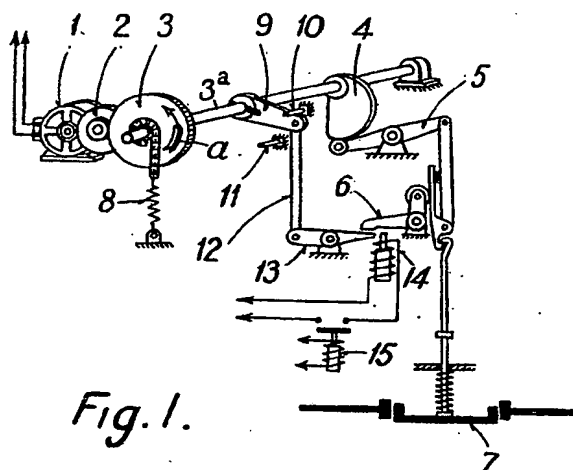


Fig. 1.

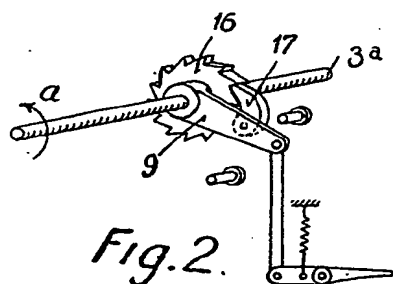


Fig. 2.

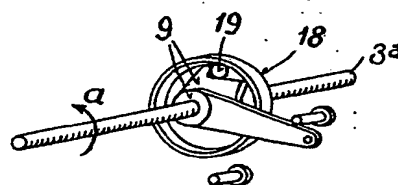


Fig. 3